

WHAT IS CLAIMED IS:

1. A hexagonal boron nitride film having a specific inductance of 3.0 or less.
- 5 2. A hexagonal boron nitride film wherein the total number of the bonds between nitrogen and hydrogen atoms and between boron and hydrogen atoms is 4 mol% or less.
- 10 3. A hexagonal boron nitride film wherein a spacing in the c-axis direction is extended by 5 to 30% from 3.3 angstroms but the extension of a spacing in the a-axis direction is limited within 5% from 2.2 angstroms.
- 15 4. A hexagonal boron nitride film wherein the direction of the c-axis is parallel to a substrate.
5. A layer dielectric film comprising a hexagonal boron nitride film having a specific inductance of 3.0 or less.
- 20 6. The layer dielectric film according to claim 5, wherein the hexagonal boron nitride contains 40 mol% or less of amorphous boron nitride, 40 mol% or less of cubic boron nitride or 40 mol% or less of amorphous boron nitride and cubic boron nitride.

7. A layer dielectric film comprising a hexagonal boron nitride film wherein the total number of the bonds between nitrogen and hydrogen atoms and between boron and hydrogen atoms is 4 mol% or less.

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8. The layer dielectric film according to claim 7, wherein the hexagonal boron nitride contains 40 mol% or less of amorphous boron nitride, 40 mol% or less of cubic boron nitride or 40 mol% or less of amorphous boron nitride and 10 cubic boron nitride.

9. A layer dielectric film comprising a hexagonal boron nitride film wherein a spacing in the c-axis direction is extended by 5 to 30% from 3.3 angstroms but the extension 15 of a spacing in the a-axis direction is limited within 5% from 2.2 angstroms.

10. The layer dielectric film according to claim 9, wherein the hexagonal boron nitride contains 40 mol% or less of 20 amorphous boron nitride, 40 mol% or less of cubic boron nitride or 40 mol% or less of amorphous boron nitride and cubic boron nitride.

11. A layer dielectric film comprising a hexagonal boron nitride film wherein the direction of the c-axis is parallel to a substrate.

5 12. The layer dielectric film according to claim 10, 11 wherein the hexagonal boron nitride contains 40 mol% or less of amorphous boron nitride, 40 mol% or less of cubic boron nitride or 40 mol% or less of amorphous boron nitride and cubic boron nitride.

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13. A method of producing a hexagonal boron nitride film by using an ion deposition method involving the radiation of a mixed ion consisting of a nitrogen ion or nitrogen and rare gas and the deposition of a boron supply source under 15 vacuum, the method comprising using a nitrogen supply source and a boron supply source containing no bond with a hydrogen atom.

14. The method of producing a hexagonal boron nitride film 20 according to claim 13, wherein the filming temperature of said substrate is designed to be 200 °C or less.

15. The method of producing a hexagonal boron nitride film according to claim 13, the method further comprising a step 25 of introducing hydrogen by ion implantation.

16. A plasma CVD apparatus comprising:

a film forming unit which forms a film having a low specific inductance as a protective film on the surface of an inter-wiring dielectric film formed on a semiconductor wafer; and

5 a heating unit which heats said semiconductor wafer to a predetermined temperature.

17. A plasma CVD apparatus comprising:

10 a first film forming unit which forms an inter-wiring film having a low specific inductance on the surface of a semiconductor wafer;

a second film forming unit which forms a film having a low specific inductance as a protective film on the surface 15 of said inter-wiring dielectric film; and

a heating unit which heats said semiconductor wafer to a predetermined temperature.

18. The plasma CVD apparatus according to claim 17, the

20 apparatus further comprising a polarity-promoting unit which makes said inter-wiring dielectric film porous.